Nutrition News

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OPTIMUM VERSUS ADEQUATE NUTRITION

By AGNES FAY MORGAN, Ph.D.
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Have you looked recently at any group of college or high school students and compared them in your own mind with similar groups of 15, 20, or 30 years ago? If you have, you have doubtless remarked the increased stature, more shapely figure, better color and better skin of the average modern youngster. Figures will support the claim for greater stature and weight of the present young generation but such data are not yet available for the other claims made. However, the same influences, largely nutritional, which have produced more rapid growth to greater size must also produce better blood, bones, skin and hair.

Many measurements of children and college students have now established the larger size at every age of both boys and girls in recent years, as compared with those of 50 or even 25 years ago. It is difficult to find any more plausible reason for this change than the rapid development of our knowledge of the food needs of man.

Comparisons have been made also of favored children with those in underprivileged economic groups and large advantages found among the former. Indeed the whole question of setting standards for the normal daily food needs of growing children has become complicated by the wide differences in growth rate of these two groups. Which shall be set up as the necessary daily intake of calcium, phosphorus or protein—that amount needed by the large rapidly growing boy in a private school or by the slower growing son of a laborer? It is more than probable that the larger intake of the necessary foods comes first and that the rapid growth follows.

If we agree that it should become the first objective of a democracy to wipe out the growth differences attributable to economic and social causes, we must recognize that this can be attained only by equalizing the

Doctor Morgan

quality and quantity of the food available to all children. Not only economic but educational measures are required to bring this about because intelligence in the choice of food is even more important than increased income, since many foods of high nutritive value cost no more than those of limited value. However, poverty increases the hazards of ignorance.

An illustration of this was seen in our supplementary feeding studies a few years ago. In a school group of poor economic status extra feeding of sugar-crackers, conveying little else than increased calories, improved the weights and heights as much as did extra milk and more than did the lower-caloric orange feeding. In a school of good economic status the milk and oranges both proved excellent growth stimulants and in an institution with carefully planned adequate diet little advantage was seen in the addition of either fruit or milk. The first limiting factor in the growth of the poorest

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Food MAKES THE DIFFERENCE

A TRUE STORY

Animal feeding experiments can produce almost any degree of poor nutritional status. It is seldom however that the human diet is so drastically deficient as to lead to physical conditions such as are reported in the following story.

The American Indian in his natural state is most boys' ideal of hardy manhood and physical perfection. Early explorers reported him as being well-built and robust. Archaeologists and physicians who have examined the skeletal remains of ancient Indians say that tuberculosis, for example, did not exist among them to any great extent. At that time, Indians, in general, were pretty healthy specimens. But with the coming of the white man's "civilization," the life of the Indian changed markedly, and the physical excellence he once may have had was soon lost.

In olden times the Indian lived in the open and ate only simple unrefined foods.

The tuberculosis rate among Indians even today with our knowledge of the disease, is four times that of the white race. The mortality rate among Indians in 1920 was nearly double that of the general population. In 1936 it was still 2.2 per cent above the average for the general population.

This amazing condition is ascribed in part to the change from a nomadic life to the restricted life on reservations. Nutritionists, however, attribute the physical decline to the change in the Indians' diet.

A study of the diets and methods of living of the Sioux Indians on the Crow Creek Reservation in South Dakota, a few years ago, revealed the appalling physical deterioration wrought by poor diet and food habits. Their diet consisted largely of "grease bread," made of white flour, and muscle meats, with almost no fruits and vegetables, eggs, milk or butter, with lard and other fats used chiefly instead of the latter.

Diets Judged Inadequate

The diets were appraised as being inadequate in the following respects: low calcium, due to limited use of milk—not over a quart a day for a family, at best, and the supply irregular; low in vitamin A and iron, since butter, green vegetables and eggs were little used; low in vitamin C, since little fruit and few canned tomatoes were eaten and then only by a few families. Sunlight in summer was considered to provide the anti-rachitic factor, but in winter there was no evident source of this vitamin. The investigators found that only five out of the sixty-seven families studied were receiving diets that appeared to be fairly adequate.

And what were the evidences of physical deterioration noted?—a great prevalence of decayed teeth, bow legs, sore eyes, blindness, a high mortality rate among children and a high incidence of death due to respiratory diseases such as tuberculosis. All of these diseases are traceable in whole or in part to specific dietary deficiencies.

It is too early to judge the full effect of preventive health programs now being actively fostered for Indians by the Federal government in cooperation with health agencies and the various states. Recent information however on efforts to improve their diet coupled with more favorable figures on physical status would indeed seem to indicate that food does make a difference.

glances AT NUTRITION RESEARCH

Animal feeding experiments lay a firm foundation for clinical investigations. The principles of nutrition are strikingly similar in most respects for animals and humans.

VITAMIN ISOLATED

Vitamin A has been isolated in crystalline form by scientists at Oberlin University. The crystalline form has been obtained from the liver oils of three different species of fish and the preparation has a value of 3,000,000 International Units per gram. Isolation of the vitamin will aid further investigations of its physiologic significance.

LACTOSE AIDS CALCIUM

The presence of lactose in the diet has been shown recently to influence favorably the utilization of calcium and phosphorus in young animals. This is not true of mature animals because the mature organism needs calcium and phosphorus for maintenance only, whereas the younger animal requires them for bone development.

OPTIMAL DIETS

When Dr. H. C. Sherman added different fractions of milk, i.e. calcium, butterfat, proteins and riboflavin (vitamin G) alone or in various combinations to an "adequate" diet of white rats there was striking physical improvement in the animals, a fact which showed that no one constituent of milk is responsible for the benefits derived from adding milk. It appears likely from this that the benefits may be due to still other "known or unknown substances" in the milk.

PROTEIN VALUES

Twenty-two amino acids, the building stones of proteins, have thus far been identified and recently the number proved to be "essential" has been raised to ten, i.e. lysine, tryptophane, histidine, phenylalanine, leucine, isoleucine, threonine, methionine, valine and arginine. Proteins which contain all of the essential amino acids are called *complete* proteins. In animal foods such as milk, cheese, eggs and meat, the various proteins present are *complete*.

A SCIENTIFIC STUDY

By Dr. J. A. Johnston
Henry Ford Hospital
Detroit, Michigan

A problem constantly before the medical profession and nutritionists is the dietary requirements of children at different ages. A number of investigators have worked on this problem in the past with the result that various "norms" have been proposed for different age groups.

Our purpose was to establish the caloric and protein requirements of boys and girls by observing them for unusually long periods of time. We used twenty-seven subjects from four to fourteen years of age and measured their food intake over periods averaging nearly nine and one-half months.

The children were each started on a measured diet at calorie levels slightly lower than those which would be expected to produce growth. Calories were then increased until there were gains in weight and height, a positive nitrogen balance, satisfaction of appetite and normal basal metabolism. With the caloric intake constant the protein content was then varied in an attempt to determine the optimal protein intake.

Dietary Requirements

Our subjects showed marked individual variation in the apparent caloric requirement. Calories per inch of height more nearly approached a constant than the other data. Gain in weight was obtained with caloric intakes representing increments over the basal calories averaging 67 per cent for the girls and 74 per cent for the boys.

In general the foundation of the basal diet was milk, one cup at each meal, with liberal amounts of fruits, vegetables and eggs, the total calories being in the ratio of 15, 35 and 50 per cent respectively for protein, fat and carbohydrate. The diets were raised in calorie value chiefly by the use of more cream and butter at meals and by the addition, between meals, of nourishing beverages using milk and fruit juices as the base.

Our particular interest has been the protein requirement. The question of what storage is optimal is not answerable. Less than 15 per cent protein too frequently resulted in negative balances, in some instances in the face of gain in weight. Amounts larger than 15 per cent were never necessary; in many instances the well-recognized

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TIMELY Topics

Nobel Prize Award—Dr. Albert Szent-Gyorgyi of the University of Szeged, Hungary, has received the 1937 Nobel prize in medicine for his work on biochemical oxidations and the isolation and identification of vitamin C. This vitamin, called cevitamic (ascorbic) acid, was isolated in crystalline form from lemon juice and has been synthesized.

Longest Milk Route—Clipper service between the Pacific coast and China has resulted in the creation of the longest milk route in the world—and also the fastest. Beginning at Honolulu and ending at Guam, it is 4,200 miles in length. Guam, Midway and Wake islands have hotels to accommodate Clipper passengers, and as none of the islands have pasturage for cows, all shipments of dairy products are made from Honolulu by Clipper service.

The service enables trans-Pacific air passengers to have fresh cream for their morning coffee, cold milk for lunch and cottage cheese for dinner.

Dental Survey—Results of an extensive survey of elementary school children made by the American Dental Association in collaboration with the U. S. Public Health Service show that dental decay is more prevalent in the northern than in the southern part of the United States.

As the diet in the north is probably not inferior to that in the south, the cause of the great difference in prevalence of tooth decay may be attributed to the difference in amount of vitamin D produced by sunshine in the two regions. These results suggest the desirability of adding vitamin D to the diet.

A PRACTICAL PLAN

By Allene Loomis
Home Demonstration Agent
Washakie County Wyoming

A 30-day food buying experiment carried on in November, 1936, under the direction of Wyoming Extension Service by a group of 45 Worland, Wyoming homemakers, was the outgrowth of an appeal to the home demonstration agent for help with the problem of trying to save the family budget in the face of advancing food costs.

Planned as a community project with membership open to any interested homemaker, it was decided to run an experiment over a period of a month in order to determine if it was possible to save the family budget actual money, yet feed husky growing boys and girls adequate, nutritious, appetizing, and satisfying meals at a reduced cost.

All of the 45 enthusiastic Washakie County homemakers at the first meeting agreed to plan menus and keep careful food accounts over the 30-day period in order to determine accurately in actual dollars and cents any savings to the family food budget.

Standards set up by the U.S. Department of Agriculture to show essential differences between liberal, moderate and minimum diets, were used as a basis in planning menus over the 30-day period. Subjects discussed at five group meetings were: the Mechanics of Menu Planning, Thrift Ideas, Child Feeding, Hurry-Up Meals and Consumer Buying.

Standards Used

To meet the government dietary standards, the meals were planned to include daily for each member of the family at least one quart of milk (one pint for each adult), one egg, two fruits (one fresh and one citrus), two vegetables—one fresh and one leafy, one meat and two cereals—one of which should be whole-grain.

Menus planned by group members were studied at the meeting in order to give each individual practice in judging her own menus, both as to adequacy and as to classification in each of the three cost levels of diet—minimum, moderate, and liberal.

"Pet thrift ideas" were contributed by each member of the group. It was found that the greatest chance for practicing thrift was in planning menus at least a week in advance, carefully marketing a week ahead of time, taking advantage of "specials,"

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DID YOU KNOW ?

—that fresh milk is the latest addition to the frozen foods group? Frozen milk may be shipped long distances, and when thawed is said to compare favorably with fresh whole milk.

—that Johnny Cake was originally called Journey Cake? It was used by hunters and traders on their long journeys on foot over Indian trails.

—that the greatest visual problem in aviation is the extent to which night blindness occurs among aviators? This condition is due to a lack of vitamin A in the diet.

—that wool is now being made from milk? Italy is using casein to make the new fabric, at half the cost of imported wool.

—that nearly one million lives were saved in one recent year as a result of modern improvements in medical and health facilities? This estimate was made by a life insurance company and is based on the decrease in death rate.

—that many of the school buildings now being constructed in England are having Milk Bars installed as part of their structure? It is expected that Milk Bars will soon form an essential part of every up-to-date English school building.

—that macaroni was so popular in Washington's time that the name became a byword for anything good or excellent (as in the old song, "Yankee Doodle" . . . "stuck a feather in his hat and called it 'Macaroni' ")?

—that the remarkably low sickness record at the National Jamboree of Boy Scouts in Washington last year was attributed in large measure to the quantity of milk used by the boys? Each Scout received a quart of milk a day.

THINGS YOU'LL LIKE TO READ

EXPERIMENTAL FOOD STUDY—by Agnes Fay Morgan and Irene Sanborn Hall. New York: Farrar and Rinehart, 1938. Pp. 414. Price $3.00.

This is primarily a laboratory manual designed for the beginning course in foods which is taught from the experimental point of view. It is not a guide for a course in cookery but for a course in food study accompanied by, or following a college course in general chemistry. The subject matter covers both the composition of food and its preparation. The laboratory directions are detailed and practicable since they were developed at the University of California over a period of twenty years.

DENTAL CARIES IN AMERICAN INDIAN CHILDREN—by Henry Klein and Carroll E. Palmer. Public Health Bulletin No. 239. Government Printing Office, Washington, D. C.

Figures are given to show the dental status of 8,257 American Indian children from 110 different Indian tribes on 76 reservations in 16 different states.

FACTS, FADS AND FRAUDS IN NUTRITION—by Helen S. Mitchell and Gladys M. Cook. Mass. Agric. Exper. Station (Amherst), Bulletin No. 342. April 1937.

This bulletin is a summary of information, decisions and criticisms by recognized authorities concerning nutritional and therapeutic claims in food advertising as well as faulty concepts regarding foods and nutrition.

ADDITIONAL MILK INCREASES NUTRITIONAL WELL-BEING—Dairy Council Digest, Vol. 9, No. 3. January 1938.

This Digest is based on newly published material of Dr. H. C. Sherman. A copy will be sent free on request to anyone not already receiving the Digest regularly. Make your request to your own local Dairy Council unit or, outside of Council territory, to the National Dairy Council, Chicago.

A PRACTICAL PLAN

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buying with the idea of "getting the most for your money," and keeping an emergency shelf to supplement meals in emergencies.

That food habits established in children of pre-school age largely determine the health picture of later years, was the basis for the discussion on child feeding problems. Consideration in selection, preparation and service of food for children were studied.

Amount of Money Saved

How did your family react to the experiment? What did you get out of the experiment? What did your analysis of your family food costs and menu planning mean to you? What was the cost per person per meal in your family for the 30-day period? What was the estimated saving to your family budget during the 30-day experiment? These were among the questions included in a questionnaire sent out several days before the last meeting in an attempt to summarize results.

The group using minimum standard diets spent an average of 11¢ per person per meal over the 30-day period. A saving of $9.25 was made for each family over the thirty days. In the group using the moderate diet the average cost per person per meal was 15¢ and the average saving per family was $4.30.

A summary discussion revealed that all of the group were serving better meals at less cost.

Optimum Versus Adequate Nutrition

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group, therefore, was total amount of food and until this lack was met no further improvement could be obtained by the use of the protective foods. In the groups of higher economic status the calorie intake was apparently adequate and the rate of gain "normal," but when sufficient growth-stimulating food was added the rate of gain was nearly doubled. Which rate of growth of these children should be accepted as "normal"? When the full advantage of even our present knowledge of nutritive needs and our abundant food production and distribution is made available to every child, new "normals" far above the present will surely be established.

A SCIENTIFIC STUDY

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phenomenon was observed of an increasing intake (beyond 15 per cent) being followed by a diminished retention, and of amounts greater than 20 per cent producing the syndrome of protein intoxication—pallor, nausea and vomiting—though usually before this point was reached there was frank refusal. Because of the inter-relationship of total calories to protein, it seems to us most satisfactory to state the protein requirement in terms of the percentage of calories allotted to protein that is necessary for normal metabolism and growth.